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PRACTICAL OBSERVATIONS ON THE Culture of Lucerne, Turnips, Burnet, Timothy Grass, and Fowl Meadow Grass,

COMMUNICATED BY

Letters to Dr. *Templeman*,

Secretary of the *Society* for the Encouragement of *Arts*, *Manufactures*, and *Commerce*.

To which is added,

An APPENDIX,

CONTAINING

Comparative Eſtimates of the Expence and Profit in Drill and Broadcast Husbandry, in different Parts of *England*, and in *Ireland*.

AND

An Account of ſome new, and improved Instruments in Husbandry, with the Prices annexed to moſt of them.

LONDON:
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TO THE

READER.

THE following Obſervations have been already publiſhed in the *Ledger*, and moſt of them at the Requeſt of the Society. They are now publiſhed, collected together, for the greater Convenience of Genlemen; and becauſe the Demand for the ſeveral Papers of the *Ledger*, which contained them, was much greater than could be ſupplied. The Appendix is added, as it tends to clear up a much agitated and important Inquiry, and as the Facts may be depended upon; for they come from Perſons of the greateſt Honour and Veracity.

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A
COLLECTION of LETTERS
ON
AGRICULTURE,
COMMUNICATED TO
The SOCIETY for the ENCOURAGEMENT of ARTS, *&c.*

LETTER I.

An Account of the Culture of Lucerne, in the Broad-caſt and Drill.

THE Farm on which the following Experiments were made, is a ſtrong Clay; a ſoil, in the opinion of all Writers in Agriculture, the moſt unfriendly to *Lucerne*. Encouraged, however, by M. *Lullin de Chateauvieux*'s Experiments, the Owner was tempted to try how the *Lucerne* would ſucceed when treated in the manner he propoſes: and in the year 1761, he ſowed a Field of about three Acres with *Lucerne* in Drills, two feet aſunder. During the firſt year, he cauſed it to be weeded carefully; and from the places where it grew too thick, he ſupplied thoſe in which it had failed. After every weeding, he cauſed the intervals to be ſtirred with a Horſe-hoe, reſembling M. *Lullin*'s ſingle Cultivator, which manifeſtly revived the plants.

In 1762, the plants throve greatly, being kept clean, and horſe-hoe'd as in the former year; and the Society having publiſhed a Premium for a comparative trial between *Lucerne* ſown in Broad-caſt, and in Drills, he determined to try one part of that experiment on this field, and not to beſtow on his *Lucerne* any Manure whatever, or to give it any other help than the horſe-hoe.

In 1763, the plants were arrived at a ſize to yield ſo full a crop as to maintain five horſes, from the middle of *May* to the end of Autumn, or about five months. Theſe horſes, though conſtantly worked very hard, had neither Corn or Hay given them during all this time; and yet they continued in ſtrength and ſpirit, and grew fat. A horſe which in *May* was ſo weak, and in ſo bad a ſtate of health, that it was thought he could not live, ſoon recovered, when fed with *Lucerne*. The plants were in general between three feet and three feet and a half high, at the firſt and ſecond cutting. The plants made ſo many ſhoots, and theſe ſhoots branched ſo much, that in three weeks after every cutting, or ſometimes ſooner, the intervals quite diſappeared; the whole field being ſo equally covered, that it looked as if ſown in broad-caſt. *December* 1763, *January* and *February* 1764, having been uncommonly rainy, the water ſtood in ſome parts of the field; and tho' there was generally ſuch a declivity as that it might have been carried off, he reſolved to let it remain, in order to ſee what effect it would have on the *Lucerne*. When the

Lucerne, began to riſe in the reſt of the field, in Sping, he found that wherever the water had ſtood, the plants were killed. He ſupplied this loſs by tranſplanting *Lucerne* from other parts; and theſe plants throve very well. By a continuance of the ſame treatment, the *Lucerne* remained in a very flouriſhing ſtate: and retained a beautiful verdure and vigour, during the very great drought of this Summer, 1765. It has yielded four cuttings every year, and ſometimes five.

Having obſerved in a root of *Lucerne* taken up in the Winter, that the Spring ſhoots had no connection or concern with the remains of the ſhoots of the preceding Summers, but proceeded from numbers of little turbercles, with which the head of the root was ſet very thick; it appeared evident, that the plants could not ſuſtain any damage, though covered with a depth of earth during the Winter. This ſuggeſted a hint, that the intervals might be plowed as deep as poſſible early in the Winter, turning the earth on the beds; and that by letting the earth remain in this condition till Spring, the clay, or ſtrong ſoil in which the *Lucerne* grew, would be mellowed, or looſened, by the Winter's froſt and rain: and being harrowed ſmooth in *February*, the freſh lateral roots, which ſhoot out in the Spring, would find a fine freſh mould to extend themſelves in, which muſt tend greatly to the benefit of the plants. This thought was confirmed by experiment: for the Spring crop is amazingly vigorous ever ſince this practice was followed, and the ſhoots though of great length, and moſt plentifully ſupplied with branches, are ſo ſtrong, that no rain or wind lays them, even when they have ſtood to be in full bloom, as is the caſe with part of the firſt crop; the horſes not being able to conſume the *Lucerne* before part of it is neceſſarily in bloom. Another advantage ariſing from this practice is, that the graſs which takes root near the plants, and which cannot be otherwiſe deſtroyed but by hand-hoeing, is killed by being ſo long covered with the earth laid on the beds.

In 1761, a ſpot of ground of an exactly ſimilar ſoil was incloſed for a kitchen garden; and there being part of it, which was not wanted for other uſe, in the Spring of 1762, it was ſown with *Lucerne* in broad-caſt, as a counter experiment to the former. The warmth of the garden, and the partiality of the gardener to this method, who held the field experiments very cheap, gave his *Lucerne* every advantage that could be deſired. It came up well, and was kept free from weeds; but it neither grew ſo faſt nor ſo high as the *Lucerne* ſown in drills. This difference became much more ſenſible during the ſecond and third years; for in 1764 the field *Lucerne* had got the ſtart of it ſo far, that this did not riſe to half the height, nor did it yield a quarter of the quantity of Fodder; ſo that he thought it needleſs to proſecute the compariſon further.

Seeing ſo very remarkable a difference between the *Lucerne* raiſed in drills, and that raiſed in broad-caſt, he reſolved to try what ſhare of this advantage might be placed to the horſe-hoe, and what to the diſtance at which the Plants ſtood; which diſtance afforded the roots more room to extend in. With this view, in 1764, he ſowed a neighbouring field in rows, two feet aſunder, intending to horſe-hoe one half, and to keep the other free from weeds by hand hoeing only.

The months of *April*, *May*, and *June* of that year were ſo dry, that the plants came up thin, and the clay was become ſo hard, that the horſe-hoe could not be made uſe of till late in the year. Even with this diſadvantage there was ſeen a manifeſt difference, in favour of the plants that were horſe-hoe'd. The ſame difference was alſo obſervable in the Spring of this year: but the uninterrupted drought of this Summer has kept the clay ſo hard that the horſe-hoe could not be uſed.

Computing the rent of the land, and the utmoſt expence that can attend the horſe-hoeings and cuttings, it will be found, that feeding horſes with *Lucerne* without any Corn, will be a great ſaving, when compared with the price of the hay and corn which theſe horſes muſt have neceſſarily conſumed in the ſame time, being kept to equally hard labour.

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LETTER II.

On the Culture of BURNET.

I Lately received a very polite letter from a member of your excellent Society, requeſting me, *that as there are many people who doubt of the uſefulneſs of* Burnet, *to inform him, by letter directed to you, how the* Burnet, *for which I obtained the Premium, has anſwered during the very dry Seaſon of laſt Summer.* To oblige this Gentleman, and to make up the deficiency in my former account of *Burnet,* when I ſent you my Certificate, is the reaſon why I trouble you with this.

My *Burnet*, though very green and beautiful all the Winter, made no great progreſs 'till the middle of *April* following, when I thought it abſolutely neceſſary to feed it. I did ſo, but I did it too late, and kept my cattle upon it too long, from the middle of *April* to the 20th of *May*. This was a very great miſtake; the *Burnet* plants were now headed for ſeed, and the ſtock chiefly fed upon the heads, which greatly leſſened my quantity of ſeed, as well as retarded the growth of the plants. I turned into the field, Ewes, Lambs, and Calves, and they all fed very greedily upon the *Burnet*. From what I had heard of M. *Rocque*, I very much expected them to ſcour, but there was not the leaſt appearance of it, and the cattle throve accordingly.

The 6th of *July* I began to mow, the weather being favourable; ſix men and four boys threſhed and cleaned the ſeed in ſeven days. I had 200 buſhels of very fine clean ſeed, as many ſacks of chaff, and ſeven loads of hay, from a field of ſeven acres and a quarter.

Satisfied that 200 buſhels of ſeed would be more than I ſhould be able to diſpoſe of, I was not anxious after another crop, being rather deſirous of ſeeing what it would perform as a paſture. Accordingly, in about ten or twelve days after the field was cleared, I turned into it ſeven cows, two calves, and two horſes; they all throve very remarkably, and the cows gave more, and we thought a richer milk than in any other paſture; I really expected, (as *Burnet* is ſo ſtrong an Aromatic) that the milk would have had a particular taſte; but far otherwiſe, the milk, cream, and butter, were as fine, if not finer taſted, than any from the beſt meadows. I am ſatisfied, that there is no better paſture for Cows, whether milched or barren, than *Burnet.* The weather was now extremely droughty, all our Paſtures were burnt up, yet the *Burnet* flouriſhed, and grew away, as if it had a ſhower every week. My ſtock of cows, horſes and calves before-mentioned, paſtured in it almoſt continually, 'till Michaelmas; by the middle of *November* it was grown ſo conſiderably, that I have again turned in ſix head of cattle, and if the weather is not ſevere, I am of opinion, it will maintain them till Chriſtmas.

The *Burnet* ſtraw, or haum, is, after the ſeed is ſeparated from it, a very uſeful fodder for horſes, cows, calves, and ſheep; the chaff is of good value, if mixed with any other, however ordinary chaff. I have fed all the above mentioned ſtock with it promiſcuouſly, together in one field; putting the haum into racks, and the chaff into troughs, and if the haum was chopped with an engine, it would ſtill be of much more value.

Burnet I am fully perſuaded will prove a very great acquiſition to huſbandry on many accounts, but more particularly for the following reaſons.

Burnet is a good Winter paſture, conſequently it will be of great ſervice to the Farmer as a conſtant crop he may depend upon, and that without any expence for ſeed or tillage, after the firſt ſowing; whereas turnips are precarious and expenſive, and when they fail, as particularly this year, the Farmer is very often put to great inconveniences to keep his ſtock.

It affords both corn and hay too. *Burnet* ſeed is ſaid to be as good as oats for horſes. I know they will eat it very well; judge then the value of an acre of land, which gives you at two mowings ten quarters of corn and three loads of hay.

The ſeed indeed is too valuable to be put to that uſe at preſent; though it multiplies ſo faſt. that I doubt not but in a few years the horſes will be fed with it.

It will bear paſturing with ſheep.

It makes good butter.

It never blows or hoves cattle.

It will flouriſh upon poor light ſandy, ſtoney, ſhaltery, or chalky land.

Burnet, after the firſt year, will weed itſelf, and be kept clean at little or no expence.

The cultivation of *Burnet* is neither hazardous nor expenſive: if the land is prepared as is generally done for a crop of turneps, there is no danger of any miſcarriage, and any perſon may be ſupplied with the beſt ſeed at ſix-pence per pound, by Mr. *Charles Thorp*, Seedſman, in the *White-Hart-In yard, Borough.*

I make no doubt but that *Burnet* might be ſown late in Spring, with oats or barley. A gentleman in my neighbourhood did ſo laſt ſummer, and it ſucceeded very well. I ſhould think a buck-wheat ſeaſon, which is ſown the laſt of all corn, would ſuit it very well; but of this I have no experience, and could wiſh to have the experiment tried. A pea-field, drill'd in rows, and kept clean, would make an excellent ſeaſon for *Burnet*, as the pea-crop would come off ſoon enough to prepare the land with two plowings by the middle of *Auguſt*, after which time I ſhould not chuſe to ſow it.

It very frequently happens, that every Farmer who ſows many acres with Turneps, has ſeveral worth little or nothing; the fly, the dolphin, the black caterpillar, the dry weather, or ſome unknown cauſe, often defeating the induſtry and expence of the moſt ſkilful Farmer. When this happens, as it too often happens, I would by all means adviſe him to ſow it with *Burnet*, and in *March* and *April* following, he will have a fine Paſture for his ſheep and lambs.

Burnet is a native of *England*, and will certainly perfect its ſeed twice in one Summer; and a Farmer, with a ſmall Plantation, may ſupply himſelf with ſeed of his own growth at very little or no expence: he may then be encouraged to make experiments on various ſeaſons, without much loſs or damage.

Thus, Sir, I have ſent you a true account of the ſucceſs of my *Burnet*, and alſo my opinion of it. I wiſh what I have ſaid may any ways contribute to diſpel the prejudice, or inform the ignorance of my country-men. I am, Sir,

Ridley, Dec. 10, 1765.

Your moſt Obedent,

Humble Servant,

DAVIES LAMBE.

LETTER III.

On the Culture and Uſe of BURNET.

IN compliance with the advice and deſire of ſeveral Gentlemen of my acquaintance, I have determined at laſt to ſend you the incloſed Certificate of my *Burnet.*

The fields contain by meaſurement ſeventeen acres, though I have only called the quantity ſixteen acres, and I ſhall be well pleaſed to find myſelf excluded by more deſerving claimants; for I thought that the Society propoſed their Premiums as a Stimulus for the Farmers; but a worthy Member of your Society told me a few days ago, that they had little hopes of moving the meer Farmer to attempt experiments of this ſort, but hoped, however, that Gentlemen might be induced to do it from offered Premiums of the Society, and that when they did, the neighbouring Farmers, who could look over the hedge, would ſoon adopt in more general practice the experiments made by the Gentlemen, when they ſaw the ſucceſs that attended them.

Whether my friend's reaſoning is right, or not, I cannot pretend to determine; however, I ſhall not content myſelf with meerly ſending you the incloſed Certificate; on the contrary, I ſhall endeavour to give you ſuch an account of the Culture and *Uſes* of *Burnet*, as, I believe, will give pleaſure to the Society, if you think proper to lay it before them.

In the years 1763 and 1764, I made ſeveral experiments on *Burnet*; with a view to make myſelf acquainted with its manner of Vegetating, and the uſes to which it might be applied: and having by this means acquired that knowlege I was deſirous of attaining, I determined laſt year to lay down ſeveral acres with *Burnet*; nor would I content myſelf with doing it in any one particular method: Therefore in the beginning of *July*, 1764, I ſowed about eight rod of ground with five pounds of *Rocque*'s *Burnet* ſeed. Rain falling ſoon after the ſeed was ſown, the plants came up very finely, and throve in ſuch a manner, that I was tempted to plough up about an acre of ground and plant it that Autumn, in order to ſee what effect the Winter would have on the young plants. Accordingly on the 4th of *October* I planted them in rows, about twenty inches apart, and about fifteen inches from each other in the rows. This diſtance, from experiments and obſervations which I have made, ſeems to me a very proper diſtance. Theſe plants took very well, and through the

Winter throve with ſurpriſing vigour. Laſt Spring I plowed the remainder of the field, being three Acres, and planted it in the ſame manner with my plants, the whole of which, notwithſtanding the uncommon drought of laſt Summer, grew well, and the verdure of the plants was really very beautiful. No water was uſed; indeed it would have been a vaſt work in a field of that ſize: however, I never ſaw any need of it. The plants were once hoed, and ſtood over for ſeed, of which the quantity collected was not very great; but this muſt be attributed to the uncommon drought, for I think we had not above one ſhower of rain from the planting to the gathering of the ſeed, the whole of which amounted to about 160 pounds.

The ſeed being got, I was impatient to ſee how the cattle would take to it, as it was roundly aſſerted by ſome Gentlemen, that no cattle would eat it. Accordingly I ordered four cows and two horſes to be turned into the field; the cows fed freely upon it, but the horſes did not ſeem to like it ſo much at firſt, though in two or three days they fed well upon it. *Burnet* has ſtrongly the taſte of cucumbers, and I was fearful it might give a diſagreeable taſte to the milk; it therefore gave me great pleaſure to find, in about four or five days, that the quantity of milk was not only much increaſed, but the flavour of the cream much ſuperior to any I had ever had before, or ever taſted from cows fed upon the richeſt meadows. The cows and horſes having fed down the field, it was hoed again, and then harrowed once over, which laid it very clean, nor could I find that the *Burnet* was at all hurt by the harrow.

Here let me obſerve to you, that I fed my horſes in the ſtables for about five weeks with the *Burnet* ſtraw, or rather haum, from which the ſeed had been threſhed. Theſe horſes fed very freely, and throve much upon it, though they had only half their uſual allowance of oats. However, as I would by no means ſecrete any circumſtance that may appear unfavourable to *Burnet*, ſo I muſt tell you that I obſerved, when any friend called upon me, and their horſes were put into the ſtable, that ſome horſes eat very greedily of it, and others would not touch it. I cannot ſay this gave me much concern. I ſatisfied myſelf with thinking, that ſome horſes did not know what was good for them; or to ſpeak more ſeriouſly, I thought the novelty of the food might as much diſpleaſe one horſe as it pleaſed another; and Dr. *Templeman* knows, that there are ſome things which we loath as children, that we are fond of as men; and that there are ſome things which we as much diſlike as men that are very wholeſome food: but to come nearer to the point; 'tis well known ſome ſheep and cows will not touch a turnip, yet is any one weak enough to infer from thence, that turnips are an unwholeſome or an improper food for cattle? and I was lately told by a particular friend, that he had often obſerved, when his horſes had fed for ſome time on the ſainfoin hay, that it was ſome days before they would again take to meadow hay,—I ſhould not have mentioned this circumſtance of the horſes, but to ſhew my impartiality; and I do it the more readily, as I find there are ſome Gentlemen who are as fond of decrying, as others can be of promoting, uſeful experiments in Agriculture.

Being well pleaſed with the ſucceſs that had attended my firſt experiment in this field. which I call four acres, I determined to proceed as I had intended in the ſpring of the year; accordingly as ſoon as the oats were got off a field of twelve acres, I ordered it to be ploughed and ſown with the 160 pounds of *Burnet*-ſeed before mentioned. This field was ſown the 26th of *Auguſt* laſt; and no rain falling till the 18th of *September*, the plants did not appear till the 28th of that month: however, there ſeems to be a good crop, and I intend as ſoon as they freſh up in the Spring, to have the plants ſet out with ſmall hoes (ſuch as are uſed for carrots and onions) to about ſix inches apart. and in about a week after this is done, I ſhall harrow it with light harrows; for from experiments which I have made, this ſeems to me to be the beſt method of managing broadcaſt *Burnet*. Having nothing farther to ſay in regard to theſe twelve acres, I muſt return to the four acre field tranſplanted, which having been hoed and harrowed as before-mentioned, was laid up for Winter-feed for my cows; but finding lately ſome Gentlemen had again aſſerted, that ſheep in particular would ſooner feed on the quick-hedges than touch the *Burnet*, I ſent to a neighbouring Farmer for his flock of ſheep, and having a friend with me, we followed the ſheep into the field, who fell upon the *Burnet* ſo greedily, that we found it very neceſſary to ſend them home again.

Being much vexed at theſe idle tales told about ſo much to the prejudice of this (as it appears to me) excellent plant, I determined to put it to as fair a trial as I poſſibly could. Accordingly, I ordered in four cows, which were in very good feed on natural graſs, and had beſides a large truſs of oat-ſtraw put in their cribs every night, notwithſtanding which they gave very little milk, andindeed were almoſt dry. Theſe cows, I declare, had not been in the *Burnet* above ſix days, before they gave much more than double the quantity of milk; nay was I to ſay three times the quantity, I know I ſhould not exceed the truth. The milk is exceeding fine, and free from all bad taſte; and further I muſt obſerve, that they ſoon began to leave half their ſtraw in their cribs; ſo that they are now ſerved with only half the quantity they had before. My land is a poor dry up-land gravel, there are millions of acres in this kingdom of better land that don't fetch two ſhillings and ſix-pence an acre. What a field therefore is here for improvement! nay, I can't but obſerve with amazement, the great numbers of Country Gentlemen who daily flock to this great city in purſuit of trifles, when they have ſuch inexauſtable funds of knowledge within themſelves, if they would properly make uſe of them; confident I am, I could point out methods of improvement that would ſurpriſingly better their eſtates.

As the account I have now given you of *Burnet* may appear a little extraordinary to ſome of the worthy members of your Society, ſo I ſhall be far from being diſpleaſed at their even doubting what I have now ſaid: on the contraay it will give me pleaſure, provided any Gentlemen, who have ſuch doubts, will do me the favour to call at my houſe, and convince himſelf by ocular demonſtration of what I have now ſaid.

I am, Sir,

Batterſea, Clapham-
Common, Jan, 6.

Your moſt Obedient,

Humble Servant,

CHRISTOPHER BALDWIN.

LETTER IV.

Some Obſervations on the Culture of BURNET.

THE public is greatly indebted to the laudable Society for the encouragoment of Arts, &c. for their having excited the attention of Farmers to the eſtimation due to the different plants uſed as food for cattle. Their ſucceſs with regard to *Burnet* promiſes great advantages, as appears by the letters lately publiſhed at the requeſt of that Society. Neither of the authors of theſe letters ſeems, however, to have treated of the culture of that plant with a ſufficient view to the principle of its being perennial. Mr. *Tull* had given the firſt hint of the proper culture of ſuch plants, in his manner of raiſing ſainfoin; but it was Mr. *Lullin de Chateauvieux* who put the finiſhing hand to it, in his experiments on *Lucerne.*

I have been led into this way of thinking, by obſerving the remarkable difference there is between the *Burnet* planted in rows, which admit of ſtirring the ground between the rows, and that which grows at random, in the broadcaſt manner. In the firſt, the plants ſoon grow to a large ſize, and make quick and plentiful ſhoots after each cutting; while the latter, though kept clear of weeds, remain much more ſtinted in their growth, and make much ſlower and leſs progreſs after each cutting. In order to try what effect the giving of the roots more ſpace to extend their fibres in, might have on the *Burnet*, I took up, laſt Spring, ſome plants which had remained two years in this ſtinted ſtate, and tranſplanted them at due diſtances. Their ſpeedy growth to fine large plants, ſending forth ſtrong ſtems well garniſhed with leaves, ſoon convinced me to what their former ſtate was owing; a ſtate in which the remaining plants continued.

This difference is eaſily accounted for by attending to the nature of the plant. *Burnet*, as well as *Lucerne*, makes ſhoots in proportion to the largeneſs of the crown of the root. The roots increaſe in ſize in proportion to the ſpace their fibres extend themſelves in, in order to collect nouriſhment; whereas whilſt other plants take up the ground, the enlargement of theſe is prevented. It may be here ſaid, that when I mention fibres, I forget that both theſe are tap-rooted plants. It is true, they are ſo; but their chief nouriſhment is collected by lateral fibrous roots. The tap-root enlarges in ſize in proportion to the ſpace of mould in which the fibres extend; as is evident by the ſize of roots which grow unincumbered by other plants, or which grow in rows that admit the horſe-hoe: whereas roots of the ſame age to which other plants are contiguous, or which have been ſown in broadcaſt, do not enlarge in ſize. It is probable that the greater ſize of the roots is not owing to the depth alone to which they deſcend, becauſe on enquiry, I believe it will be found, that the tap-roots deſcend equally deep, whether in broadcaſt or in drills. An inſtance of this was this year ſhewn in the Committee of Agriculture, in a root of *Lucerne*, which, in a Nurſery where the plants had been ſown thick in order to their being tranſplanted, had deſcended very deep in leſs than five months, it being about four feet long when taken up.

The number of ſhoots from a large root increaſe perhaps in the ſame proportion as the contents of a circle do to its diameter; *i. e.* as the ſquares of their diameters. It is known that a bore of three inches will give three times more water than three bores of one inch each; or nine times the quantity that a bore of one inch can. One plant then, whoſe crown of the root is three inches in diameter, will make as many ſhoots as nine plants of one in diameter.

In order to arrive at the ſize of one inch in diameter, a plant of *Lucerne*, for example, muſt ſtand at three inches diſtance from any other plant. Suppoſing therefore, that the *Lucerne* is planted in rows at three inches diſtance, and that the plants are three inches aſunder in the rows, each plant takes up a ſpace of nine ſquare inches: conſequently, nine plants take up eighty one ſquare inches. If then the large plant makes as many ſhoots as the nine ſmaller ones, the large plant, in a ſquare of eighty one inches, is equally profitable. But as few roots of *Lucerne* arrive at one inch in diameter, when ſown in broadcaſt, we ſhall perhaps be nearer the truth, if we ſuppoſe them half an inch each. In this caſe the root whoſe crown is three inches in diameter, ſhall yield as many ſhoots as thirty-ſix half-inch roots; and the large rooted plant ſtanding in a ſquare of 324 inches, will be as profitable as thirty ſix of the half inch rooted plants. In order to allow of more convenient culture, let us ſuppoſe that the plants are ſet in an oblong ſquare, or parallellogam of fifty four inches in length, and ſix inches in breadth, or in the firſt proportion, in an oblong ſquare of 20 inches in length and four in breath; or in other words, let the rows be four feet ſix inches aſunder, and let the plants ſtand ſix inches apart in the rows, as in the firſt caſe; or let there be twenty inches between the rows, and four inches between the plants, as in the latter caſe; there will then be room ſufficient to admit of horſe-hoeing, or any other improvement which may be thought wanting. Facts will, I believe, juſtify this reaſoning, as will appear in the whole ſeries of *Chateauvieux*'s experiments *; and alſo by the account given by the Gentleman who obtained the gold medal of the Society this year †.

If we apply this reaſoning to *Burnet*, it will be found equally juſt; and by what I have ever obſerved, more in favour of the diſtant plantation: becauſe not only the number of leaves and ſtems, but alſo the height of the ſtems, and their being plentifully garniſhed with leaves depend more on the largeneſs of the roots in *Burnet* than in *Lucerne.* The not attending to the different effects of raiſing *Burnet* with either a conſiderable or a ſmall diſtance between the plants, has perhaps diſcouraged many perſons from extending, or even continuing their cultivation of this plant: for finding it difficult, in the broadcaſt way, to keep it clear from weeds during its infant ſtate, and that it afterwards arrived at no conſiderable ſize, they either neglected it, or gave it up.

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* See *Chatteauvieux*'s Experiment in *Mill*'s Huſbandry, Vol. iii.

† See the account publiſhed the Ledger, *February* the 6th. and now republiſhed in this collection, p. 2.

It is often ſaid, that *Burnet* weeds itſelf. This is true when the plants have grown large, and extend their leaves on the ground for ſix or eight inches round, as every other plant within the ſhade of their leaves will then be killed: but whilſt young or ſtinted, the caſe muſt be otherwiſe; for their leaves bring few in number, the weeds riſe up cloſe with the *Burnet*: and if the weed happens to be a more luxuriant plant than the *Burnet*, this laſt may be killed. In order to prevent this inconvenience, Mr. *Rocque* adviſes to mow the whole field, forgetting that many weeds may ſhoot with vigour equal to that of the *Burnet*, tho' others die. It will therefore be much more adviſeable to plant it in rows in ground brought to very fine tilth, at ſuch diſtances as at leaſt to admit the plough or horſe-hoe between them. If Gentlemen are fond of having fields full of plants, this may be obtained with greater ſafety by permitting the *Burnet* to drop its ſeed on the looſe mould between the rows, after the original plants have acquired their proper ſize. The original plants may thus preſerve their ſize for ſome years, and the poſſeſſor may pleaſe himſelf with the ſeeming abundance of his *Burnet*. I doubt not but that my opinion will be juſtified by the accounts which the Candidates for the Society's next premium on *Burnet* muſt give in with their claims; for one of the conditions is, that the *Burnet* muſt have been kept clear of weeds for two years.

Burnet has not yet been long enough in uſe to make us ſufficiently acquainted with its merit in fattening cattle and ſheep; though very favourable inferences may be drawn from ſome inſtances. For example, ſome cows got into a field of *Burnet* which was then in full crop, the plants having been ſaved for ſeed. They eat greedily of it for near an hour, and then returned into the field from whence they had come. They returned again on the following days, and their eating of it was conſtantly attended with the ſame ſatiety in nearly the ſame time, as long as they had a full bite. I have been informed that ſheep which had been ſent into a field of *Burnet* were obſerved to lie down much more than they uſually do in common paſtures; probably on account of the ſame ſatiety, ariſing from the richneſs of its juices. Independent of fattening, I am perſuaded that the Winter and Spring feeding which it will yield ſheep, will render *Burnet* one of the greateſt acquiſitions that has been made in agriculture for ſome ages. This acquiſition becomes the more valuable now, when there is a general complaint that land is ſurfeited with turnips and clover; for the crops of both theſe, eſpecialy the latter, fall ſhort of what they uſed to be, and yet no other viſible cauſe can be aſſigned.

Burnet has an advantage over turnips, which may often greatly enhance its value in the Spring; this is, that it is much more proof againſt ſevere froſts than turnips are. I have heard it obſerved by a very judicious farmer, that when the degree of froſt was ſuch as to ſink *Farrenheit*'s Thermometer about fifteen degrees below freezing, the turnips were totally deſtroyed, being reduced to a putrid maſs on a thaw. This, added to its conſtant vegetation on every return of mild weather, renders *Burn t* a real treaſure.

I may likewiſe mention another advantage of *Burnet*, which I have not obſerved in any other plant. It is, that, when eaten down, the farther progreſs of the plant is not by an elongation of the blades fed upon, as in graſſes; but from freſh blades which daily ſpring from the root; I may almoſt ſay daily, as the former blades are eaten off. By this quality, the plant is not liable to be exhauſted, or as it is uſually expreſſed, to bleed ſo as as to weaken, or rob it of its juices.

Having mentioned the probability of *Burnet* becoming ſo uſeful a food for ſheep, a thought occurs to me, which I wiſh ſome Gentleman reſiding in the country would aſcertain by experiment. Our Engliſh paſtures afford a food for ſheep ſo well ſuited to the production of good wool, that from this ſource, our national ſtaple and wealth ariſe. Our wool was famed for its goodneſs long before the manufacture of cloth was eſtabliſhed here; when, as hiſtory informs us, the duty on the exportation of wool was a conſiderable article in the King's revenue. The effect that *Burnet* may have on the wool of ſheep fed with it becomes therefore a matter of the greateſt importance; for if it has the leaſt ill effect on the wool, no conſideration ſhould induce us to ſuffer it to become a food for them.

Having ſaid ſo much of *Burnet*, as a food for cattle and ſheep, let me take this opportunity of communicating to the Public an information given to the Society for the encouragement of Arts, &c. by a Candidate for a premium on *Lucerne*, living in the neighbourhood of a ſea-port lately much reſorted to for the convenience of drinking the ſalt-water. He fed ſome cows on *Lucerne*, and ſold their milk to the company reſident there during the Summer. Towards the cloſe of the ſeaſon, the cows became ſo fat, that he thought it a pity to loſe the ſale of them, whilſt in ſo good a ſtate for the butcher. He accordingly ſold one, whoſe fleſh proved in ſo fine an order, ſo beautifully marbled, and ſo well reliſhed, that thoſe who eat of the beef deſired to be particularly informed when the butcher ſold more beef fed on the ſame farm. The ſecond proved like the firſt; and the fleſh might have been ſold at a conſiderably advanced price. I have been informed, that the like advantages have attended the fleſh of other creatures fed on *Lucerne*, in regard to fatneſs and reliſh.

LETTER V.

On the advantages of the Drill Huſbandry in the Culture of Turnips.

THE generous method you have taken to promote uſeful knowledge muſt give every lover of his country the greateſt pleaſure, and incline him to do all in his power to increaſe it; 'tis with this view, and by the perſuaſion of many friends, I preſume to lay before you the following lines, hoping they may give you ſome ſatisfaction in reſpect to the difference betwixt the old and new Huſbandry.

I began Huſbandry in the year 1742, had always an inclination to drilling, and was at much trouble and expence in getting one inſtrumen- after another made for the purpoſe; but was often diſappointed, and for ſome years was forced to lay by the thoughts of it. About eight years ſince a Gentleman lent me Mr. *Tull*'s Treatiſe; I then got ſome new inſtruments made, which ſowed very regularly, and ſince that time have ſowed all my corn in rows. — Several cloſes I ploughed in ſix furrow ridges, and ſowed with three rows of wheat, ploughing the intervals with a ſmall ſull, drawn by one horſe, and made it fit for wheat the next year; it generally took one third of the common quantity of ſeed, and in two years it yielded more than half as much again as the beſt crops in the common way did in one year; which, conſidering the ſmall expence of ſeed and labour, was ſome advantage, though not very great; but then it left the ground in very good order for the next crop of Spring corn. I kept one cloſe, about two acres, four years to Wheat in the ſame method, but the two laſt years did not anſwer to the two firſt, which makes me think Mr. *Tull* wrong when he ſays, that plants of different natures are nouriſhed by the ſame ſort of food. I could give an account of the exact quantity produced in each year, but it would be tedious: upon the whole I believe this method of ſowing wheat will be of no advantage except in poor ſtrong clays, where I apprehend it muſt exceed all others. But there are a few inconveniencies attending it; frequent ploughing the intervals is apt to make the wheat ſhoot freſh ears, which do not ripen with the others; and if any of the full ears when near ripe do but touch the freſh-ploughed earth, ever ſo little wet will make them ſprout, and theſe will injure the whole crop; and I find it impoſſible to keep all up, as the rows are at ſo great a diſtance. But my method of drilling in the open fields, and which I intend to follow, is to put five rows about eight inches apart, on a ridge about five feet in breadth. This takes but two-thirds of the ſeed ſowed in the common way, and has always produced a better crop than the lands on each ſide of mine; this my neighbours are now convinced of, and ſeveral of them have drilled their wheat this ſeaſon: Our ſoil, for the moſt part, is a deep heavy ſand.

I apprehend the principal advantage in drilling wheat is placing it at a proper depth, which I think is within two inches or thereabouts. I have obſerved, that the firſt motion of the wheat is by ſome roots, which in a little time run very deep; then it ſhoots up its blade; next it begins to form a head, about an inch under ground, from which come (very ſoon in a mild ſeaſon) the ſecond and third blades; and after this it begins to ſhoot freſh roots and branches from this ſame head, till in time it grows very large, eſpecially in a fruitful ſoil and a good ſeaſon; and it keeps on ſhooting freſh roots all the growing ſeaſon: now if the corn is too deep, and a ſevere froſt happens while this head is forming, the plant is quite deſtroyed: but if it lies ſhallow it ſhoots a new blade from the corn, and goes on in its operations as before; this was the caſe in 1763, a ſevere froſt happened in the night of the 13th of *February*, which deſtroyed a good deal of wheat; ſo that ſome which lay deepeſt was ploughed up, and ſown with other ſeed in the Spring. Laſt year multitudes of plants were killed in the ſame manner, and brought the crop very thin. In ſhort, I am very certain, that whoever will make their obſervations will find that what I have ſaid is the truth; that the ſhalloweſt corn will flouriſh ſooner and better, and from thence will be led to ſee the advantage of drilling wheat.

But although I intend leaving Mr. *Tull*'s method of ſowing wheat, yet I hope always to follow it in Beans and Turnips.

My beans I have ſown theſe four years in double rows, about ten inches a part, and about two feet intervals. Theſe I plough from and to the beans, when about ſix inches high; this is done with a little Sull drawn by one horſe, and will plough three acres in a day. This method hath ſucceeded ſo well, that many are come into it; although the Farmers have always an averſion to new methods of managing; we ſow but one-third of the ſeed, and have a much better crop, as is allowed by all.

As for *Turnips*, all my neighbours will allow the drill to beat every thing. I ſow a double row about eight inches wide, on a ridge about five feet, and though I did not ſow this year till *Auguſt*, I have *Turnips* two feet round, after wheat. I have given them but one ploughing as yet, beſides hoeing them out at proper diſtances. I believe all will acknowledge I have double the crop in weight with any ſown in the old way. I left four intervals unploughed in one cloſe, to ſee the difference, and it is very ſurpriſing. One of my neighbours was prevailed on to ſow a few rows in a piece he was ſowing, and let my man plough them. The difference is ſo great that he is become an advocate for the Drill Huſbandry; indeed I do believe that it will ſoon make its way through all the prejudices of the old Farmers to the contrary; eſpecially as we have a Drill invented by an ingenious Carpenter, with which ſeveral Farmers have ſown Beans, Peaſe, Turnips and Wheat, and it anſwers exceedingly.

Thus I have laid before you the reſult of my experiments and obſervations for more than twenty years, as far as they relate to your propoſals; and hope it may meet with your approbation. And if at any time I can be of any ſervice to my fellow creatures it will be the greateſt pleaſure to me; who am,

Your moſt obedient,
Humble ſervant,
JOHN WILLY.

South Petherton,
Nov. 23, 1765.

LETTER VI.

On the Advantages of the Drill Huſbandry in the Culture of TURNIPS, *continued.*

YOURS of the 4th Inſtant I received, and with pleaſure give my anſwer as follows: I aſſure you, that for theſe ſeventeen or eighteen years paſt, I have been ſtriving to improve a crop of *Turnips*—Before this, nothing was known or aimed at hereabouts, but ſowing in the common way, one pound of ſeed on an acre; and then come thick, come thin, weeds and all grew together, till the ſheep were turned in to eat the crop as it was, and generally it was very poor.

The firſt improvement I made was by *Ellis*'s direction, to drag them well with heavy harrows till they were got pretty thin, by which method I ſoon got better crops than any about me. But then I ſowed double the quantity of ſeed, that I might have ſufficient ſtock of plants for my after huſbandry. My neighbours were ſoon convinced of the advantage of this, and followed my example, which is now the common practice. After this, finding the thinneſt was beſt, I got ſome hoed: this I found ſtill better, but very expenſive, our people not being uſed to it. I tried Mr. *Ellis*'s receipt to prevent the fly from deſtroying the young plants, but my ploughmen refuſed to ſow the ſeed when mixed with ſulphur. I then invented a long box, made full of holes, for the ſeed to fall through, and faſtened it to two wheels ſo as to keep it above ground; this went ſo light that a boy could draw it, and ſowed the ſeed very regularly. I ſhewed this to a friend of mine, (Mr. *Joſeph Pittfield*, of *Sidland* in *Dorſet)* who had one made immediately; and ſoon made an improvement on it, by having the holes made in rows about a foot aſunder. Finding that the plants could be thinned and cleared at a much leſs expence, I followed this method of ſowing for myſelf, as did ſome of my neighbours, for ſome years, and with a deal of ſatisfaction. On reading Mr. *Tull*, a few years ſince, I was willing to try what ſtirring the ground deeper would do; and being reſolved to try the Drill Huſbandry in corn likewiſe, I had a ſmall Sull made, with which one horſe will plough more than two acres in a day, firſt turning four or five inches deep from the plants and then back to them again: we generally ſow *Turnips* after Wheat, Peaſe and Flax, and my method is to plough the ground into ſix furrow ridges, which with the open furrow makes about five feet in breadth. On ſuch a ridge I ſow (out of a ſhort box) two rows of ſeed, though ſometimes but one, and harrow it in with a very light harrow. When they have four or five leaves I get them thinned, and give them a ploughing; and ſometime after, when they begin to kern, I have them thinned and cleaned again: and this is all the Husbandry I have hitherto beſtowed, and all I think is neceſſary, as we don't ſow till late; the coſt of which is about three ſhillings *per* acre.

I have ſown ſome betwixt rows of beans, and they anſwered very well: when the beans were pulled, I had the plants thinned and cleaned, and the earth ploughed betwixt the rows.

The firſt I ſowed laſt year was a ſmall piece about half an acre, where hemp failed: I had the ground ridged up, and ſowed with two rows of ſeed, and managed, as I ſaid before: indeed the ground was dunged for the hemp. This was ſown the latter end of *July*, but did not come up till the middle of *Auguſt*, for the want of rain. I pulled them before *Chriſtmas*, and had fifteen putt loads, which every one will acknowledge to be a good crop; I believe double a common one: and though the rows were four feet apart, the leaves touched each other. The next I ſowed was after wheat, about the middle of *Auguſt:* when the wheat was carried off, I had the ground ploughed into ridges where the old furrows were, and ſowed one row of ſeed on each ridge: theſe coſt but little in thinning and cleaning, and once ploughing, and were a very good crop: the largeſt of them was more than two feet round and weighed above ſix pound: indeed towards the hedges they were much ſmaller; I had fifteen putt loads *per* acre, tho' the ground had borne three crops ſince it was dunged. Another piece of two acres I ſowed after peaſe, in double rows; but not till the latter end of *Auguſt:* I had the ground ridged up, and when the plants were fit, I had them thinned and cleaned as uſual, but left four ridges for ploughing to ſee the difference; and truly it was ſurprizing: thoſe that were ploughed were more than three times as large, though they had all the ſame Huſbandry, except ploughing. They are as good a crop as the wheat ſtubble, though ſown later, which makes me think double rows are beſt: our ſoil is moſtly heavy good ſand.

Thus, Sir, I have given you the beſt account I can, in which I fear I have been too tedious; but I hope it will meet with a candid reception, and that every thing amiſs will be overlooked or blotted out, which will be gratefully acknowleged by,

SIR,

South Petherton, Feb. 8, 1766.

Your moſt humble Servant,

JOHN WILLY.

LETTER VII.

Obſervations on TIMOTHY GRASS, *and* FOWL MEADOW GRASS.

THE favourable reception you gave my obſervations on the culture of *Lucerne* and *Burnet*, encourages me to trouble you with ſome hints relating to two Graſſes not yet ſufficiently known to Farmers. The Graſſes I mean are *Timothy Graſs*, and *Fowl Meadow Graſs*, called *Bird Graſs* by Mr. *Rocque*, to whom the Public is conſiderably indebted for their introduction into *Britain*. Had it not been for his careful culture of them, the generous intentions of the late Reverend Doctor *Eliot* of *New-England* *, that friend of mankind, had been fruſtrated; and *England* had at leaſt for ſome years been deprived of the very great advantages which will probably ariſe from them.

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* See *Mills*'s Huſbandry, Vol. III.

The firſt of theſe, the *Timothy Graſs*, is in appearance a coarſe Graſs, very little promiſing to be a paſture agreeable to cattle. Indeed its appearance ſo ſtrongly prejudiced many againſt it, that it would have been at once condemned to neglect, had it not been reſcued by the enterprizing diſpoſition of Mr. *Rocque,* who had ſown a conſiderable ſpot of ground with the ſeed firſt ſent from *America*; yet the fact is, that, whilſt in ſap, it is more agreeable to horſes and cattle than any other Graſs has been obſerved to be. Mr. *Rocque*'s horſe ſoon gave him a convincing proof of this; for having got looſe, he left very fine *Lucerne,* and the moment he reached the *Timothy Graſs*, inſtead of ranging about, as uſual with horſes, he eat clean before him.

Deer, which are very nice in their food, are ſo fond of it, that, as I am well aſſured by gentlemen from *North America,* they ſow *Timothy Graſs* there on the ſkirts of their corn land near the woods; in order to keep the deer from eating their corn; the *Timothy Graſs* being much more agreeable to them than even corn.

The dry hay of the *Timothy Graſs* is exceedingly agreeable to cattle, as appears from a remarkable inſtance mentioned in a converſation in the Society for the Encouragements of Arts, *&c.* A worthy Huſbandman*, who had himſelf often experienced how fond his cows and horſes were of it, carried a friend into the field, that he might have ocular demonſtration of it. The Huſbandman took a tuft of dry *Timothy Hay* in his hand, and as ſoon as one of the cows ſaw it, ſhe came inſtantly to feed on it, though there was plenty of good Graſs under foot. Another cow ſoon followed the firſt, and both eat greedily of it: but each of them refuſed to eat the hay of common Graſs, which happened to be mixed with it. So fond were the horſes and cows of this hay, that they would follow a perſon * having ſome of it in his hand, as readily as they would one who carried corn for them.

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* *Et virum bonum cum laudabant, ita laudabant, bonum agricolam, bonumque colonum. Ampliſſime laudari exiſtimabatur, qui ita laudabatur.*

CATO DE RE RUSTICA, Lib. I.

Shall we impute the peculiar reliſh of this hay, to a cauſe ſimilar to that to which *Pliny* imputes the fertility of the ſoil of *Italy* during the virtuous ſtates of the *Roman* commonwealth? "*Quænam ergo tantæ ubertatis cauſa erat? Ipſorum tunc manibus imperatorum colebantur agri (ut fas eſt credere) gaudente terra vomere laureato, et triumphali aratore: ſive illi eadem cura ſemina tractabant, qua bella, eademque diligentia arva diſponebant, qua caſtra: ſive honeſtis manibus omnia lætius proveniunt, quoniam et curioſius fiunt.* Plinii Hiſtoria Naturalis, lib. xviii. cap. 3.

A very great advantage attending the *Timothy Graſs* is, that it thrives well in ſuch wet marſhy land as will ſcarcely yield any other good Graſs: and here, its numerous and matted roots make ſo ſtrong a ſward, that land which was before a looſe mire, ſhall become ſo firm as to bear cattle and even carriages without their ſinking into it.

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* The perſon here alluded to, is one who had a very conſiderable command both in *Germany* and at the *Havannah*.

It is almoſt needleſs to add, that in order to ſow *Timothy Graſs* ſeed in ſuch marſhy land, it muſt be drained, and then all the inequalities common in ſuch land, as well as the ſtrong matted roots of coarſe Graſs ſhould be taken up and burnt. The land being then ploughed and laid ſmooth, the aſhes ſhould be ſpread upon it, and the ſeed may be ſown early in the autumn; or rather, the plants ſhould be raiſed in a nurſery, and ſet in it at ſix or eight inches diſtance, every way, from each other. This Graſs will alſo thrive well on a clay bottom, where water is apt to ſtagnate in rainy ſeaſons.

The *Fowl Meadow Graſs* delights in a moiſt bottom, but a ſoil richer than the former requires; ſuch as flat low meadows. It will grow on meadows which are dryer, but not yield ſo great an increaſe. Its appearance indicates this to be a valuable Graſs. It has a property, which ſo far as I know, is peculiar to itſelf. All other Graſſes wither into a dry ſtraw as ſoon as they have perfected their ſeeds. but this Graſs, as ſoon as its ſeed begins to ripen, ſhoots out freſh ſtems from every joint. Theſe ſtems grow quickly to a conſiderable length, and run alſo to ſeed. The whole plant continues in ſap after the firſt ſeed is even dropped, owing probably to the circulation of the juices kept up by theſe young ſtems; and the hay made of it at this time looks as green, and is as ſoft as the hay of other Graſſes which have been cut down at a proper ſeaſon. There is not only a ſhoot upwards from every joint, but the joint alſo takes root, if it touches the earth. The Reverend Dr. *Elliot* was the firſt who mentioned this ſingularity

gularity in the *Fowl Meadow Graſs*; and at the ſame time pointed out a conſiderable advantage attending it, *viz.* that if, on account of rain or any other neceſſary delay, this Graſs ſtands beyond the proper time of cutting it, the Farmer is no loſer, becauſe this Graſs does not rot or wither, as other Graſſes would do; and the freſh ſhoots from the joints make ſuch an additional weight as proves a full recompence for the longer time the Graſs has ſtood.

The condition which the Society for the Encouragement of Arts, *&c.* have annexed to their Premium for Graſs, ' of the Graſſes being ſown " in drills," will be attended with this advantage, that Huſbandmen wil ſee the ſize to which different Graſſes will grow, when their roots have ſufficient room in which they can extend themſelves. The advantage of being thus planted ſeparately appears in no Graſs more remarkably than in *Timothy* and *Fowl Meadow Graſſes*. A very ingenious and worthy Huſbandman, who was led by accident to tranſplant ſome of each of theſe Graſſes, was ſo much pleaſed with his ſucceſs, that he now intends to extend his culture of theſe plants in this manner: and whoever examines them at Mr. *Rocque*'s, will inſtantly perceive how much the tranſplanted *Timothy Graſs* has the advantage of that ſown in Broadcaſt. It will at firſt be a matter of great difficulty to prevail on Farmers to execute any plantation at the great expence and trouble of planting a field of graſs in ſingle plants; but ſo far as I have yet ſeen I dare prognoſticate, that in leſs than three years, the ſuperior advantage of the tranſplanted crop will manifeſtly juſtify my opinion.

When the *Timothy* and *Fowl Meadow* Graſſes are intended to be cultivated by tranſplanting them, the ſeeds ſhould be ſown in a nurſery; and the land in which they are to be planted, being in order, the plants ſhould be ſet at ſix or eight inches diſtance every way; the diſtances being proportioned to the richneſs of the ſoil. Thoſe Graſſes tiller or ſtalk ſo much, that in one year the ground will be ſufficiently covered with plants. Spring or Autumn are proper ſeaſons for tranſplanting; but rather the latter, becauſe the plants having taken good root during the Winter, will be enabled to make vigorous ſhoots in the Spring, and will ſoon increaſe into large tufts of Graſs.

The *Timothy Graſs* will grow to the height of three or four feet high. I have been aſſured by a Gentleman, that he has ſeen it between five and ſix feet high in *Virginia*. If it is cut down before the ſeed ripens, it will ſoon ſhoot anew, and yield a good ſecond crop. The *Fowl Meadow Graſs* grows to the height of about three feet, and will ripen its ſeed twice in a ſeaſon: we may therefore infer, that it may be cut for hay thrice in a ſeaſon. It is not an early Graſs; but as ſoon as it begins to ſhoot, it makes up for that loſs by its ſpeedy growth. During the drought of laſt Summer, the ſecond crop made a ſurprizingly quick progreſs. Its not being an early Graſs is perhaps no loſs; for as it delights in rather moiſt meadows, the ground might be poached, were cattle tempted to go early to feed on it.

If, from ſome imperfection in the ſoil, the plants of either of theſe Graſſes do not fill the ground ſufficiently, they may be let run to ſeed, which falling in the vacant ſpaces, ſoon ſupply the want. So far as we have yet obſerved in this country, theſe ſelf ſown plants do not arrive at the ſize of the parent plants, which were ſet at due diſtances: and this affords good reaſon to think, that if the ſeed was ſown in broad-caſt, and the plants came up thick, they would in the ſame manner be ſtinted in their growth.

Whatever expence may attend the tranſplanting, yet it ſeems in ſome degree neceſſary for the *Fowl Meadow Graſs*, becauſe the growing of the ſeed is very uncertain, as appears by every experiment yet made in *England*. I cannot aſſign any other reaſon for this uncertainty, but the difficulty of hitting the proper depth at which the ſeed ſhould be buried. By its readily growing when it falls from the plant, it ſeems as if this ſeed ſhould be very little covered with earth. It is hence neceſſary, that the land on which it is ſown ſhould be very fine, and in good order. The *Timothy Graſs* ſeed grows much more freely than the former.

The ſucceſs of the *Timothy Graſs*, when ſown alone, demonſtrates the utility of ſowing the ſeeds of each Graſs ſeperately, in order to form a juſt eſtimate of their comparative values: for though this Graſs is a native of *England*, being a ſpecies of the Fox-tail; it has hitherto been rather neglected than cultivated, even though nature has pointed it out as an uſeful plant in wet meadows, by its early verdure and growth. I make no doubt but that the practice of raiſing Graſſes ſeparately, will bring other no leſs valuable Graſſes to light.

I ſhall cloſe this letter by recommending it to Huſbandmen, who deſire to improve their paſtures, to examine what plants in common paſtures are ſo conſtantly eaten down by the creatures feeding there, as to be kept from running to ſeed; for they may preſume that ſuch plants are agreeable to either the ſheep or cattle fed there: or they may attentively remark, what plants each kind of animal feeds upon by choice, or preference, on being firſt turned into a freſh paſture. An inquiry of this kind may point out ſome plants, at preſent little thought of, as articles of paſture which may be ſelected, and ſuited to the natures of different ſoils, and to the different creatures intended to be fed with them. ſhall juſt mention two plants, *Mil-foil* or *Yarrow*, and the Narrow-leaved *Plaintain*, which ſome Farmers have found very agreeable to ſheep and cattle, and which promiſe ſucceſs on dry light ſoils, becauſe they ſtrike deep roots.

APPENDIX

CONTAINING THE

ADVANTAGES

OF THE

Drilling and Horſe-hoeing TILLAGE,

ABOVE THE

Broad-caſt TILLAGE;

Extracted from the Accounts of the EXPERIMENTS ſent to the Society of Arts, *&c.*

ALSO,

A COMPARATIVE CALCULATION

OF

EXPENCE and PROFIT,

BETWEEN THE

Drill and the Common HUSBANDRY.

Taken from Mr. BAKER's Report to the *Dublin* Society of his EXPERIMENTS in Agriculture for the Year 1765, publiſhed by Order of the Society.

LIKEWISE

An Account of the INSTRUMENTS of HUSBANDRY, made in the New Factory at *Laughlinſtown*, in the County of *Kildare*, in *Ireland*.

THE ADVANTAGE OF THE Drilling and Horſe-hoeing TILLAGE, ABOVE THE Broad-caſt TILLAGE.

THE Manner and Expence of cultivating Lands for Corn in ſeveral Counties in *England* being materially different, 'tis thought proper to prefix to theſe Calculations of the comparative Profits ariſing from the Broad-caſt, and from the Drilling and Horſe-hoeing Tillage in *Cumberland* and *Yorkſhire*, an Account, as well of the Prices of Labour, *&c.* as of the Manner in which each kind of Tillage is practiſed in theſe ſeveral Counties: To the End that Farmers, who are the Perſons more immediately intereſted, may have every Circumſtance expoſed to their View that may the better enable them to form their Judgments on the following Eſtimate.

The Prices of Labour, *&c.*

In CUMBERLAND.

	s.	d.
Ploughing *per* Acre	3	6
Manure, *per* One Horſe Cart load	0	4
Lime *per* Buſhel *(Wincheſter)*	0	2
Hire of Man and One Horſe Cart *per* Day	1	10
Ditto of a Labourer *per* Day	0	10
Horſe-hoeing *per* Acre drilled	1	2
Rent of Land *per* Acre	8	0
Harrowing *per* Acre	0	6
Wheat *per* Buſhel	4	0

The Kind of Soil on which the Experiments were made,

In CUMBERLAND.

A heavy moiſt Soil on a Clay Bottom, rather too ſtiff for Barley.

The Broad-caſt Tillage *of One Acre of Land,*

In CUMBERLAND.

N. B. The Land on which the Experiments were made in this County, were ploughed out of Lea, and bore a Crop of Oats.

The Firſt Year for TURNIPS.

	Expences. l.	s.	d.
Three Ploughings with two Horſes, the Firſt in *March*, Second in *May*, Third in *June*	0	10	6
60 One-Horſe Cart Loads of Manure	1	0	0
90 Buſhels *(Wincheſter)* of Lime	0	15	0
Six Days Work of Man and Horſe leading the Manure, and two Ditto the Lime	0	14	8
Two Days Work of a Labourer ſpreading the Manure	0	1	8
Seed and Sowing	0	2	0
Three Harrowings	0	1	6
Total Expence the Firſt Year	3	5	4

N. B. In the above, as well as in all the following Calculations, the Expence of Reaping, Threſhing, and ſending to Market, is omitted; it being countervailed by the Price or Value of the Straw, (according to General Eſtimation) which laſt is likewiſe omitted in the Computation of the Value of the Crops.

The Value of the Crop of Turnips computed 3l.

The

The Prices of Labour, *&c.*
In YORKSHIRE.

	s.	d.
Ploughing *per* Acre — —	4	0
Manure *per* Load — —	2	6
Hoeing an Acre of Turnips in Broadcaſt, during a Seaſon — —	6	0
Handhoeing *per* Acre drilled — —	2	6
Horſehoeing ditto — —	1	0
Drilling *per* Acre — —	0	6
Rent of Load — —	15	0

The Kind of Soil on which the Experiments were made,
In YORKSHIRE.

Inclining to a Hazel Mould but light and dry.

The Broad-caſt Tillage *of One Acre of Land,*
In YORKSHIRE.

The Firſt Year for TURNIPS.

	Expences. l.	s.	d.
Four Ploughings — —	0	16	0
Harrowing and Seed — —	0	2	0
Hoeing the Turnips — —	0	6	0
15 Load of Dung — —	1	17	6
Total Expence	3	6	0

Value of the Crop of Turnips 2l.

The Broad-caſt Tillage *of One Acre of Land,* *In* CUMBERLAND.

The Second Year for FALLOW, and the Third Year for WHEAT.

	Expences. l.	s.	d.
Four Ploughings — —	0	14	0
Four Harrowings and Sowing —	0	2	6
Seed Wheat — — —	0	12	0
Total Expence	1	8	6

The Value of the Crop, *viz.*
3 Quarters of Wheat at 4s. *per* Buſhel 4l. 16s.

N. B. In this County the Broad-caſt Tillage does not admit a fourth Year's Crop without a conſiderable Loſs: Therefore after the Third Year the Land is again manured, and the ſame Proceſs repeated for three Years more, and ſo on from three Years to three Years.

Note alſo, 24 Buſhels (in *Cumberland*) make a Quarter: But in *Yorkſhire* eight Buſhels make a Quarter, and four Pecks, or nine Gallons make a Buſhel. So that the Buſhel uſed in *Cumberland* is but one Third of that uſed in *Yorkſhire*.

The

The Broad-caſt Tillage *of One Acre of Land,*
In YORKSHIRE.

The Second Year for BARLEY.

	Expences. l.	s.	d.
Two Plowings and Harrowings —	0	10	0
Three Buſhels of Seed Barley and Weeding	0	8	0
Total Expence	0	18	0

Value of the Crop of Barley, *viz.*
Four Quarters at 18s. *per* Quarter, 3l. 12s.

The Third Year for CLOVER.

	l.	s.	d.
14 Pounds Wt. of Clover Seed —	0	4	0

Value of Two Crops Clover, 1l. 10s.

The Fourth Year for WHEAT.

	l.	s.	d.
One Plowing and Harrowing —	0	7	0
Three Buſhels of Seed and Weeding —	0	16	0
Total Expence	1	3	0

Value of the Crop of Wheat, *viz.*
Three Quarters at 1l. 16s. *per* Quarter 5l. 8s

N. B. In this Kind of Tillage the Land never lies Fallow: And after the fourth Year, the ſame Proceſs is repeated for four Years more, and ſo on.

The Drilling *and* Horſe-hoeing Tillage *of One Acre of Land in* CUMBERLAND.

N. B. The Land on which the Experiments were made in this County were firſt ploughed out of Lea, and bore a Crop of Oats.

The firſt Year for TURNIPS.

	Expences.		
	l.	s.	d.
Three Ploughings with two Horſes, *viz.* the Firſt in *March*, Second in *May*, Third in *June*	0	10	6
30 One-horſe Cart Loads of Manure	0	10	0
45 Buſhels (*Wincheſter*) of Lime	0	7	6
Three Days Work of a Man and Horſe leading the Manure, and One ditto the Lime	0	7	4
One Day's Work of a Labourer ſpreading ditto	0	0	10
Seed	0	0	6
Harrowing and Drilling	0	1	6
Three Horſe-hoeings, each equal to one-third of an Acre	0	3	6
Total Expence	2	1	8
Value of the Crop of Turnips 2l. 10s.			

The Second Year for BARLEY.

Two Ploughings, *viz.* the Firſt in *March*, and the Second in *April* or *May*	0	7	0
Seed Barley, *viz.* 1 Buſhel (*Wincheſter*)	0	2	0
Harrowing and Drilling	0	1	6
Three Horſe-hoeings	0	3	0
Total Expence	0	14	0
Value of the Crop of Barley 1l. 16s.			

The Third Year for WHEAT.

One Ploughing before *Michaelmas*	0	3	6
Seed Wheat	0	3	6
Harrowing and Drilling	0	1	0
Five Horſe-hoeings	0	5	10
Total Expence	0	13	10
Value of the Crop of Wheat, *viz.* 15 Buſh. 3l.			

N. B. The fourth Year a ſecond Crop of Barley, and the fifth Year a ſecond Crop of Wheat at the like Expence, and with like Profit, and then after the fifth Year the whole Proceſs is repeated. The Ridges are formed five Feet and half wide, and a treble Row of Drills ſeven Inches aſunder, on the Top of each Ridge.

The Drilling *and* Horſehoeing Tillage *of One Acre of Land in* YORKSHIRE.

FOR BARLEY.

	Expences.		
	l.	s.	d.
Two Ploughings, *viz.* the firſt in *Autumn*, and the ſecond in *Spring* — —	0	8	0
Seed Barley, *viz.* One Buſhel or four Pecks	0	2	1½
Three Horſehoeings, *viz.* on the 30th of *May*, 7th of *June*, and the Beginning of *July*	0	3	0
One Handhoeing on the 8th *June* —	0	2	6
Total Expence annually — —	0	15	7½

Value of the Crop, *viz.* 3 Qrs. 6 Buſh. 2 Pecks, at 18s. *per* Qr. 3l. 8s. 7½ d.

FOR WHEAT.

	l.	s.	d.
Two Ploughings — —	0	8	0
Seed Wheat, *viz.* One Buſhel or four Pecks	0	4	4
Three Horſehoings — —	0	3	0
One Handhoeing — —	0	2	6
Total annual Expence	0	17	10

Value of the Crop of Wheat, *viz.* 2 Qrs. at 1l. 16s. *per* Qr. 3l. 12s.

N. B. The Ridges are here formed four Feet and a Half wide: And a double Row of Seed, Ten Inches aſunder, drilled on the Top of each Ridge: The Intervals for Horſe-hoeing being thus Three Feet Eight Inches. The ſame Proceſs, and the ſame Expence is repeated annually: And a Piece of Ground in *Yorkſhire*, under this Method of Tillage, had yielded the Eighth ſucceſſive Crop, *viz.* Four of Barley, and Four of Wheat, at the Time the Account was ſent to the Society, of the Values above ſpecified, without ever having had any Manure beſtowed upon it, and without ſhewing any Sign of Impoveriſhment, being then, to all Appearance, in full Heart.

An Eſtimate *of the Advantage of the* Drilling *and* Horſe-hoeing Tillage, *above the* Broad caſt Tillage, *as both are practiſed in* CUMBERLAND *and* YORKSHIRE.

In order to aſcertain the proper Method of Calculation, whereby to arrive at a deciſive Eſtimate of the comparative Profits from the two Kinds of Tillage; it becomes in ſome Meaſure expedient here to inſert an Abſtract of two Experiments, contained in the Accounts mentioned in the Title Page: And the rather that Experiments of this Kind, coming ſo properly authoriſed to the Society, ought not to remain in obſcurity. Theſe Experiments were made to prove the Difference of the Acreable Produce, and the Difference of the Rate of Increaſe from the Seed ſown as well in Broad-caſt, as in various Forms of Drilling

In YORKSHIRE.

Quantity of Seed ſown on One Acre.

		Pecks.	Prod.	Rate of Increaſe.
A. D. 1763.	In Broad-caſt - -	10	178	Seventeen-fold.
	In equidiſtant Drills -	6	194	Thirty-two-fold.
	In double Drills, 11 Inch. aſunder, and 4 Feet 10 Inches Interval - -	3	102	Thirty-four-fold.
	In treble Drills 7 Inches aſunder, and 4 Feet 3 Inches Interval - -	2	100	Fifty-fold.

Quantity of Seed ſown on One Acre.

		Pks.	Prod.	Rate of Increaſe.
A. D 1765.	In Broad-caſt (Barley) -	9	137	Fifteen-fold.
	In equidiſtant Drills -	8	144	Eighteen-fold.
	In double Drills 10 Inch. Diſtant, and 3 Feet 8 Inches Interval. - -	4	136	Thirty-four-fold.

N. B. This laſt is that preferred in the *Yorkſhire* Drilling-Tillage before ſpecified, Now Firſt, That the Rate of Increaſe alone, is not the proper Standard to form a Judgment of the Profits of either Kind of Tillage, will be evident from a ſlight Attention to the foregoing Experiment. The Quantity of Seed requiſite to ſow an Acre of Land is in itſelf ſo ſmall, *viz.* at the utmoſt but Eight or Ten Pecks, that it is of very little Conſequence to a Farmer, whether he ſows Ten Pecks (as in the common Broadcaſt) or only Two Pecks (as in the Treble Drill Method) on an Acre. But when he conſiders that from the Firſt, his Acre will produce him 178 Pecks, and from the Second but 100 Pecks; there appears ſuch a Difference in the Acreable Produce as muſt engage his Attention: So that taking nothing into the Account beſides the Quantity of Seed ſown, the Acreable Produce, and the Rate of Increaſe, he muſt neceſſarily prefer the Method which gives him the 178 Pecks on an Acre, to that which gives him only 100 Pecks, notwithſtanding that the Latter is an Increaſe Fifty-fold, and the former only Seventeen-fold.

But ſecondly, That neither is the Acreable Produce the proper Foundation for our Calculations, is evident from this, that the Expence of Cultivating for the 178 Pecks *per* Acre, may happen to be proportionably greater than that of Cultivating for the 100 Pecks *per* Acre; ſo that the Profit upon each may be equal: In which Caſe the Farmer muſt prefer the 100 Pecks *per* Acre as affording him an *equal Profit* at a *leſs Expence*, though in Fact it be the leſſer Acreable Produce. And if the Expence of the 178 Pecks *per* Acre were any Thing greater than proportionable, there would then be a double Reaſon for preferring the leſſer Acreable Produce, *viz.* as giving a *greater* Profit at a *leſs* Expence.

Laſtly, 'tis plain from what has been ſaid that the proper Ground for calculating the comparative Profits of each Kind of Tillage will be found in conſidering the *Expences* and the *Returns* made in each, in any given time, and when Corn is at any given Price. For thus it will eaſily and plainly appear, in which of theſe two Kinds of Tillage a Farmer can turn his Stock of Money to beſt Account: Which is the only material Queſtion. Nor can the Inſtability of the Price of Corn, any wiſe impeach the Certainty of this Method of Calculation, ſince to whatever Price it riſes or falls, the Returns from each Kind of Tillage muſt riſe or fall in like Manner; ſo that the Difference of Profit muſt always remain proportionally the ſame.

This then is the Method of Calculation obſerved in the following Eſtimate.

In CUMBERLAND.

Broadcaſt Tillage of One Acre.

	Seed ſown.	Expence.			Value of the Crop.		
		l.	s.	d.	l.	s.	d.
1ſt Year —	Turnips	3	5	4	3	0	0
2d Year —	Fallow }	1	8	6	4	16	0
3d Year —	Wheat						
Total —	—	4	13	10	7	16	0
Deduct Expences		——			4	13	6
					3	2	2
Deduct Three Years Rent		—			1	4	3
Neat Profit from One Acre in Broadcaſt for three Years —					1	18	2

Drilling Tillage of One Acre.

	Seed ſown.	Expence.			Value of the Crop.		
		l.	s.	d.	l.	s.	d.
1ſt Year —	Turnips	2	1	8	2	10	0
2d Year —	Barley —	0	14	0	1	16	0
3d Year —	Wheat —	0	14	10	3	0	0
Total —	—	3	9	6	7	6	0
Deduct Expences		——			3	9	6
					3	16	6
Deduct Three Years Rent		—			1	4	0
Neat Profit from One Acre in Drilling for Three Years. —					2	12	6

In YORKSHIRE.

Broad-caſt Tillage of One Acre.

	Seed ſown.	Expence.			Value of the Crop.		
		l.	s.	d.	l.	s.	d.
1ſt Year —	Turnips	3	1	6	2	0	0
2d Year —	Barley -	0	18	0	3	12	0
3d Year —	Clover -	0	4	0	1	10	0
4th Year —	Wheat -	1	3	0	5	8	0
Total —		5	6	6	12	10	0
Deduct Expence —					5	6	6
					7	3	6
Deduct Four Years Rent —					3	0	0
Neat Profit in Four Years —					4	3	6

Drilling Tillage of One Acre.

	Expence.							Value of the Crop.					
	Barley.			Wheat.			—	Barley.			Wheat.		
	l.	s.	d.	l.	s.	d.		l.	s	d.	l.	s.	d.
1ſt Year	0	15	7½	0	17	10	—	3	8	7½	3	12	0
2d Year	0	15	7½	0	17	10	—	3	8	7½	3	12	0
3d Year	0	15	7½	0	17	10	—	3	8	7½	3	12	0
4th Year	0	15	7½	0	17	10	—	3	8	7½	3	12	0
Tot.	3	2	6	3	11	4	Tot.	13	14	6	14	8	0
Deduct Expences								3	2	6	3	11	4
								10	12	0	10	16	8
Deduct four Years Rent								3	0	0	3	0	0
Neat Profit in four Years								7	12	0	7	16	8
								Barley.			Wheat.		

CALCULATION in CUMBERLAND.

	l.	s.	d.
The neceſſary Expences for three Years Tillage of one Acre in *Broadcaſt, viz.* 4l. 13s. 10d. producing neat Profit only — —	1	18	2
Will from the above Accounts be ſufficient to till 1 Acr 1 R. 16P. for the ſame Number of Years in *Drilling*, and will produce neat Profit	3	10	9
Difference of Profit from 4l. 13s. 10d. in three Years in ſavour of Drilling —	1	12	7

But ſince this Method of Drilling Tillage requires a Renewal of Manure only every five Years, whereas the Broadcaſt Method requires it every three Years; therefore, taking the Profits in each Kind of Tillage for fifteen Years together, will give the true Proportions.

Thus the ſaid Sum of 4l 13s. 10d. in Broadcaſt Tillage for fifteen Years, will produce a neat Profit of — —	9	10	10
But the ſame expended in Drilling and Horſehoeing Tillage will in the ſame Number of Years produce a neat Profit of — —	22	1	2¼

And whatever Price Corn, &c. bears the Returns made by each Kind of Tillage will bear a Price proportional to theſe two Sums; or the Profits on the Drilling Tillage in this County for fifteen Years together will always be to that on the Broadcaſt Tillage for the ſame Time as 22l. 1s. 2¼d. is to 9l. 10s. 10d. that is as 23 is to 10 nearly.

CALCULATION in YORKSHIRE.

	l.	s.	d.
The neceſſary Expences for four Years Tillage of one Acre in the improved Broad-caſt Tillage, *viz.* 5l. 6s. 6d. producing neat Profit only — — —	4	3	6
Will be ſufficient to till 1 Acre 2 R. 22 P. 6. for the ſame Number of Years in the Drilling Method, and will produce a neat Profit			
In Barley — —	12	19	0
In Wheat — —	12	17	1½

Which is more than three Times the Profit that is yielded by the Broadcaſt Method.

A Comparative CALCULATION of EXPENCE and PROFIT between the *Drill* and the *Common Huſbandry*, taken from Mr. *Baker*'s Report to the DUBLIN SOCIETY of his Experiments in AGRICULTURE, for the Year 1765. Publiſhed by Order of that SOCIETY.

An *Eſtimate* of the Expence upon a Plantation * Acre of Wheat, in the *Common Huſbandry*.

	l.	s.	d.
TO the firſt Plowing, commonly called breaking for Fallow, 8 Horſes, 8s. 2 Plow-men 1s. 4d. 2 Drivers, 1s.	0	10	4
To the firſt Harrowing, 4 Horſes 4s. a Driver 6d.	0	4	6
To the 2d Plowing, commonly called Gaurowing	0	10	4
To the ſecond Harrowing	0	4	6
To the third Plowing, commonly called Stretching	0	10	4
To ſowing the Seed, 8 Horſes 8s. 2 Plow-men 1s. 4s. 2 Drivers 1s. the Seed-man 8d.	0	11	0
To Seed Wheat, one Barrel	1	0	0
To Rent for the Year of Fallow	0	18	0
To ditto, the Year the Crop is growing	0	18	0
	5	7	0

In this Account 40s. are charged for 40 Horſes, employed in the Culture of one Acre for Wheat, in the common Huſbandry; a Charge which ought to be conſidered by the Farmer, for he actually buys and maintains his Horſes for this Buſineſs.

The Crop which follows Wheat is generally Oats; but ſometimes Peas are ſown inſtead of Oats; with ſome, the Practice is to let the Peas follow Oats, in which Caſe they fallow only every fourth Year; but where Land receives no other Aſſiſtance than what ariſes from Fallow, it is a bad Practice not to fallow every third Year. It is the general Practice to plow but once for Oats, and therefore it ſhall be ſtated ſo; but it is a much better Practice to plow the Wheat Stuble once before Winter, and again in the Spring.

An Eſtimate of Expence upon an Acre of Oats:

	l.	s.	d.
To Plowing once	0	10	4
To ſeed Oats, 2 Barrels	0	12	0
To Harrowing 4s. 6d. Seed-man 4d.	0	4	10
To one Year's Rent	0	18	0
	2	5	2

Theſe two Crops conſume three Years; after which the Farmer is to begin again, and to incur every Article of Expence ſtated in the above Accounts, in order to obtain two Crops more.

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* An *Iriſh* Acre contains 7840 ſquare Yards.

An *Eſtimate* of Expence upon a Plantation Acre of Wheat in the *Drill Huſbandry*, the firſt Year.

TO Plowing 4 times, to prepare the Fallow	2	1	4	This is the ſame Charge as in preparing for the Common [Huſbandry.
To Harrowing twice for ditto —	0	9	0	This is the ſame alſo.
To Rent for the Year of Fallow —	0	18	0	This Charge is ſaved after the firſt Year.
To Harrowing with the Drill Harrows	0	0	6½	Four Acres a Day may be harrowed with one Horſe.
To ſowing with the Drill Plow —	0	1	1	From 3 to 5 Acres may be ſown in a Day.
To Seed Wheat generally 5 Stone, but ſuppoſe 6,	0	6	0	
To the firſt, or Winter Hoeing —	0	1	7	Two Acres may be hoed in a Day, two Horſes, Plowman and Driver: The Deſign of this Hoeing is to leave the Plants dry, and to meliorate the Earth.
To the Spring Hoeing with the Cultivator	0	1	1	To deepen the Soil, one Horſe, Plow-man and Driver.
To the 3d. Hoeing, *i. e.* to return the meliorated Earth to the Corn — —	0	1	7	To make the Corn tiller, *i. e.* to increaſe its Branches.
To the fourth and final Hoeing —	0	1	1	To fill the Grain and render it large.
To Rent, the Year the Corn is growing	0	18	0	
	4	19	3½	

☞ Altho' the Drill Culture for the firſt Year is very near as expenſive as the Common, yet after taking the Crop, the Expence and Labour of Fallow, and Loſs of Time is not to be incurred again, as is unavoidable in the Common Husbandry.

An Eſtimate of Expence upon an Acre of Drilled Wheat after the firſt Crop:

To Plowing the Land once —	0	10	4	One Plowing is all that is neceſſary.
To Harrowing with the Drill Harrow	0	0	6½	
To ſowing with the Drill Plow —	0	1	1	
To Seed-Wheat — —	0	6	0	Be it remembered, 5 *Stone is enough.*
	0	17	11½	
To four Times Horſe-hoeing, as before ſtated	0	5	4	
To one Year's Rent — —	0	18	0	
	2	1	3½	

Thus the Land is ſown again with Wheat every Year, and inſtead of 4l. 9s which is the Farmer's Expence in the Common Husbandry, excluſive of one Year's Rent of the Land: In the Drill Method it is no more than 17s. 11½d. and the Total Expence, inſtead of 5l. 7s. is no more than 2l 1s. 3½d. Rent included; whereby there is a Saving of 3l. 5s. 8½d: an Acre.

Before the Account of Profit and Loſs upon theſe different Methods of Culture be ſtated, it will be neceſſary to take Notice of an objection, which may perhaps be made to the above Charge of Plowing in the Common Husbandry.

It is pretended, that three Quarters of an Acre may be plowed in a day, with one Plow: But can it be done effectually? The Land may, indeed, be *ſcratched*, but cannot really be plowed as it ought to be.

The Farmer ought to be cautioned againſt a Trick too frequently practiſed in Plowing.

When a Plow-man enters his Plow and paſſes acroſs the Field, he turns a Sod about a Foot abroad; when he is to return, he enters his Plow about four feet diſtant from the Outſide of the former Furrow, and ſo turns another Sod of the ſame Breadth, which, when turned, juſt meets the former Sod; thus four Feet of the Land appear to be plowed, whereas the Fact is, that the two Feet lying under the Sods is not touched with the Plow at all.

This Deception, added to the Practice of juſt *ſkimming* the Ground, enables Hirelings to undertake Plowing at Six and Seven Shillings an Acre.

But if a Plantation Acre of Land be well and effectually plowed, Ten Shillings and Fourpence as charged above, will not appear too much; and it is, in Fact, ſupported by the common Courſe of Buſineſs.

When Wheat is to be ſown, it is the general Cuſtom to ſend a Barrel of Seed into the Field with two Plows, which is to ſow an acre of Land, and that is the uſual Days Work for two Plows in the general Courſe of Buſineſs.

Let us ſee then, what the Expence will amount to: Eight Cattle will be Eight Shillings, Two Plow-men One Shilling and Four-pence; Two Drivers One Shilling, and the Seed-man Eight-pence, which in all makes Eleven Shillings, and correſponds with the above Charge.

Dr. One Acre of Wheat and Oats in the Common Husbandry, for 15 Years. *Per-Contra*, Cr.

		l.	*s.*	*d.*				*l.*	*s.*	*d.*
To the Expence on a Wheat Crop,	2d. Year	5	7	0	By the Produce of Wheat,	9 Barrels,	at 20s.	9	0	0
To the Expence on an Oat Crop,	3d. Year	2	5	2	By the Produce of Oats,	14 ———	at 6s.	4	4	0
To the Expence on a Wheat Crop,	5th Year	5	7	0	By the Produce of Wheat,	9 ———	at 20s.	9	0	0
To the Expence on an Oat Crop,	6th Year	2	5	2	By the Produce of Oats,	14 ———	at 6s.	4	4	0
To the Expence on a Wheat Crop,	8th Year	5	7	0	By the Produce of Wheat,	9 ———	at 20s.	9	0	0
To the Expence on an Oat Crop,	9th Year	2	5	2	By the Produce of Oats,	14 ———	at 6s.	4	4	0
To the Expence on a Wheat Crop,	11th Year	5	7	0	By the Produce of Wheat,	9 ———	at 20s.	9	0	0
To the Expence on an Oat Crop,	12th Year	2	5	2	By the Produce of Oats,	14 ———	at 6s.	4	4	0
To the Expence on a Wheat Crop,	14th Year	5	7	0	By the Produce of Wheat,	9 ———	at 20s.	9	0	0
To the Expence on an Oat Crop,	15th Year	2	5	2	By the Produce of Oats,	14 ———	at 6s.	4	4	0
		38	0	10				66	0	0
To clear Profit in 15 Years	———	27	19	0						
		66	0	0						

One Acre of Drilled Wheat, for 15 Years.

Dr.	l.	s.	d.	Per Contra, Cr.	l.	s.	d.
To the 1ſt and 2d. Year's Expence —	4	19	$3\frac{1}{2}$	By the Produce of Wheat, 2d. Year, 6 Barrels	6	0	0
To the — 3d. Year's Expence —	2	1	$3\frac{1}{2}$	By the Produce of Ditto. 3d. Year, 6 —	6	0	0
To the — 4th Year's Expence —	2	1	$3\frac{1}{2}$	By the Produce of Ditto, 4th Year, 6 —	6	0	0
To the — 5th Year's Expence —	2	1	$3\frac{1}{2}$	By the Produce of Ditto, 5th Year, 6 —	6	0	0
To the — 6th Year's Expence —	2	1	$3\frac{1}{2}$	By the Produce of Ditto, 6th Year, 6 —	6	0	0
To the — 7th Year's Expence —	2	1	$3\frac{1}{2}$	By the Produce of Ditto, 7th Year, 6 —	6	0	0
To the — 8th Year's Expence —	2	1	$3\frac{1}{2}$	By the Produce of Ditto, 8th Year, 6 —	6	0	0
To the — 9th Year's Expence —	2	1	$3\frac{1}{2}$	By the Produce of Ditto, 9th Year, 6 —	6	0	0
To the — 10th Year's Expence —	2	1	$3\frac{1}{2}$	By the Produce of Ditto, 10th Year, 6 —	6	0	0
To the — 11th Year's Expence —	2	1	$3\frac{1}{2}$	By the Produce of Ditto, 11th Year, 6 —	6	0	0
To the — 12th Year's Expence —	2	1	$3\frac{1}{2}$	By the Produce of Ditto, 12th Year, 6 —	6	0	0
To the — 13th Year's Expence —	2	1	$3\frac{1}{2}$	By the Produce of Ditto, 13th Year, 6 —	6	0	0
To the — 14th Year's Expence —	2	1	$3\frac{1}{2}$	By the Produce of Ditto, 14th Year, 6 —	6	0	0
To the — 15th Year's Expence —	2	1	$3\frac{1}{2}$	By the Produce of Ditto, 15th Year, 6 —	6	0	0
	31	16	1				
To clear Profit in 15 Years —	52	3	11		84	0	0
	84	0	0				

	l.	s.	d.
To clear Profit ariſing upon an Acre of Land in 15 Years, in the Drill Husbandry —	52	3	11
To clear Profit ariſing upon an Acre of Land in 15 Years, in the Common Husbandry —	27	19	2
Greater Profit on the Drilled Acre in 15 Years — — —	24	4	9

Which amounts to 1l, 12s. $3\frac{3}{4}$d. *per Annum*, for 15 Years, on the Acre, *more* than by the Common Husbandry.

In the Drill Huſbandry the Crops are ſtated at three Barrels of Wheat leſs upon an Acre than in the Common Huſbandry, that it may not be ſuppoſed to be over-rated; but in the Common Huſbandry, the Crops are rated at the higheſt; 14 Barrels of Oats an Acre, are alſo allowed in the Common Huſbandry, which every Farmer muſt admit to be great Allowance upon the general produce.

That the Drill Culture will produce ſix Barrels an acre, is fully proved in Mr. *Baker*'s Report at large, which will ſhortly be publiſhed, where it will be ſhewn, that much more has been produced.

Doubtleſs it will be obſerved, that in fifteen Years fourteen Wheat Crops are obtained in the Drill Huſbandry; in the Common Huſbandry only five Wheat and five Oat Crops; the five other years are not only loſt, but are an heavy expence to the Farmer.

A Farmer having forty Acres of Tillage, ſuppoſing him to direct his Attention to bringing it to the Drill Culture, would make in fifteen Years 969l. 10s. more than he can in the Common Huſbandry; which is ſuch an Advantage, that the greater Profit in the Drilled Acre in fifteen Years will purchaſe the Fee Simple of that in the Common Huſbandry, at twenty-ſeven Years purchaſe, valuing the Land eighteen Shillings an Acre.

Thus it appears, that in every fifteen Years the Fee Simple of all the Tillage Lands of the Kingdom, is loſt to the Community by the common Courſe of Tillage.

In ſtating theſe Accounts, no mention is made of Fences, Water cutting the Land, Weeding and Reaping, as theſe Articles of Expence depend upon Variety of Circumſtances, but in general, will be more upon the common Huſbandry than the Drill.

Implements of Huſbandry *made in the New Factory at* Laughlinſtown, *under the Patronage of the Right Honourable and Honourable* Dublin Society.

THE Drill Plough, upon an improved Conſtruction, for ſowing all Kinds of Grain, Pulſe, Turnip, and ſeveral Kinds of Graſs Seed, 9l. 2s.—*N. B.* The Prices affixed are in the *Iriſh* Currency.

The Drill Harrows compleatly mounted, quite of a new, perfect, and ſubſtantial Conſtruction, 5l. 13s. 9d.

The Hoe Plough, 2l.

The Single Cultivator, 1l. 14s. 1½d.

The Double Cultivator, 2l.

The above three are for Horſe-hoing Drilled Crops.

The marking Plough with Carriage and Marker compleat, 3l. 8s. 3d.

The double mold board Hoe Plough, 5l. 13s. 9d.

N. B. *The above are for the Drill Huſbandry, but the two laſt are not abſolutely neceſſary.*

A Drill Plough of a new Conſtruction, for ſowing Drill Crops in the flat Way, at equal diſtant Rows.

The common Chip Plough, improved and compleatly ironed.

The Block Plough improved and compleatly ironed, 2l. 10s.

The Hunting-Plow improved, and compleatly ironed, 2l. 10s.

The Baiting Plough of a new Conſtruction and compleatly ironed, 2l. 16s. 10½d.

The *Eſſex* Plough improved, to work with one Man and two Horſes, 2l. 5s. 6d.

The *Lomax* Plough, improved and compleatly ironed, to work with four Cattle, 2l. 10s.

The ſame Plough for two Cattle, 2l.

The Garden Plough for one Horſe, 2l.

The Turn Wriſt or Kentiſh Plough, with or without Wheels.

Mr. *Tull*'s four Coultered Plough, 9l. 2s.

The Drain Plough, *i. e.* to cut out Drains. This is an entire new Inſtrument, 6l. 16s. 6d.

The Ditching Plough, *i. e.* to ſink Ditches. This is a new Inſtrument, 1l. 14s. 1½d.

The *Hertfordſhire* or double Wheel Plough.

The *Oxfordſhire* or ſingle Wheel Plough.

The Anchor Plough. This is an entire new Inſtrument, and will plough above two Acres a Day.

The Scarificator with five Coulters, for taking Moſs off Meadow Land, and otherwiſe improving it, 4l. 11s.

Double Harrows for *four* Cattle. New Conſtruction.

Ditto, for two Cattle. A New Conſtruction.

A large Harrow upon Wheels. A new Inſtrument.

Triangular Plough Harrow, 5l. 13s. 9d. A new Inſtrument.

Triangular Plough Harrow, for one or two Horſes, chiefly for Peas. A new Inſtrument.

Garden Hand Harrows.

Flax Harrows. A new Conſtruction.

Swingle Trees improved and compleatly mounted.

Sledges and Truckles of any Conſtruction, for Ploughs, Harrows, Buſhes, Timber, Sacks of Corn, Lead, &c.

One Horſe Carts of any Conſtruction.

Three wheeled Carts, for one, two, or three Horſes.

Larger Carts, for any Number of Horſes.

Bomb Carts.

Small Carts of a new Conſtruction, for Lawns or Graſs Walks, which will not cut the Sod.

Water Carts of any Conſtruction.

Low Back Carrs upon an improved Conſtruction, calculated for the Eaſe of Cattle.

Coach, Poſt-chaiſe, and other Wheels.

Wheel-barrows of a neat and ſtrong Kind.

Wheel-barrows of a new Kind.

Wheel-barrows for Gardens, which will not cut the Walks.

Water-barrows for Gardens.

Weed-barrows for Gardens.

Graſs-barrows for Soiling Plough Cattle, when ſtanding yoaked in the Field.

Sheep-Racks of a new and compleat Conſtruction. Field Gates of any Conſtruction.

Rollers for Corn and Meadow, of a compleat and new Conſtruction.

Spiked Rollers of any Conſtruction.

A Roller of a new Conſtruction, for reducing Fallows, be they ever ſo ſtubborn.

Fanners for Winnowing Corn in the Barn. Of different Conſtructions.

Braſs Wire Sieves, for Corn and Seeds.

Hay Rakes of a neat and ſtrong Kind.

Iron Rakes of various Kinds.

Hay Forks. Hay Pitching Forks.

Three pronged Forks for Dung.

Three pronged Forks for raiſing Stones and Rubbiſh out of Gardens.

Drag Forks for Dung.

Dock Irons for pulling up the Roots.

Brier Dog for pulling up Briers and Buſhes by the Roots.

Stumping Irons for compleatly taking the Beards off Barley with Expedition.

Engines for cutting Hay and Straw for Horſe Meat.

Ventilators for Hay Ricks. A new and uſeful Inſtrument, by which the Hay may be ſayed without being put in Tramp Cocks.

Bee Houſes and Boxes, for taking the Honey without killing the Bees.

Gearing for Plough Cattle, upon a compleat and new Conſtruction, by which the Cattle cannot be cut or hurt.

Manger Collars and Chains for Horſes.

Cribs of a neat and new Conſtruction, for foddering Black Cattle.

Spades of the neateſt Kind, both for ſtrong and reduced Ground.

The Drain Spade and Scoop, for ſinking narrow ſubterraneous Drains.

Mattocks, Picks, and Crows.

Blaſting Tools for Quarries.

The Turnip Slicing Engine. A new Inſtrument, *i. e.* for ſlicing Turnips for Black Cattle, by which two Men will ſlice a Ton in an Hour.

The Stubble-horſe Raker, for ſpeedily pulling up and gathering Stubble at one Operation.

An Inſtrument for thinning and horſe-hoeing Turnips ſown in the Broad-caſt Way.

FINIS.